

Lower Duwamish Waterway Source Control Project

King County International Airport Slip 4 Early Action Site Source Control

Monitoring Report - June 2006 Stormwater Vault Sediment Sampling

Prepared for the

King County Department of Transportation
Airport Division

by the

King County Department of Natural Resources and Parks
Wastewater Treatment Division

October 2006



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1. INTRODUCTION

In early 2007 a decision will be reached whether potential sources of chemicals of concern are sufficiently controlled to allow sediment remediation to proceed at the Slip 4 early action site. The most important pathway for chemicals to be transported to Slip 4 is through stormwater runoff from surfaces containing target chemicals originating from current or historic practices.

The stormwater basin that drains to Slip 4 includes properties leased or owned by Boeing, King County, and the City of Seattle.

In support of Lower Duwamish Waterway sediment remediation source control, this monitoring report covers the field and laboratory activities associated with sediment sampling of stormwater structures at the King County International Airport (KCIA). King County performed this work to evaluate if portions of KCIA contain target chemicals in sufficient amount to cause a concern for the potential recontamination of sediments at the Slip 4 early action site.

2. STUDY AREA

The KCIA portion of the Slip 4 drainage basin encompasses the northern portion of KCIA. The KCIA basin is further divided into several sub-basins that drain to individual stormwater vaults. These vaults are large underground concrete structures that are designed as oil-water separators. However, due to their size, they also slow the linear velocity of stormwater and provide a degree of particle settling. The oil retention feature of these structures also can result in increased levels of petroleum hydrocarbons in the bottom sediments. Therefore, because of the particle settling and oil retention features of these structures, caution should be applied when evaluating vault sediment concentrations in the context of sediment transport to Slip 4.

The vaults are configured to allow stormwater to flow through them under low-flow conditions, but allow high-flow bypass to occur via upgradient manhole overflow weir configurations. These stormwater vaults are identified on **Figure 1**.

It is important to note that there are some portions of KCIA that are downgradient of the stormwater vaults; however, these sections of KCIA contain runways that are routinely swept or contain grassy portions. These areas are not expected to be significant sources of target chemicals.

3. STORMWATER SEDIMENT SAMPLING

From Jun 6, 2006 to June 8, 2006, King County Industrial Waste Program staff collected sediment samples from eight (8) stormwater vaults at KCIA. The sample locations are identified on **Figure 1** (according to KCIA Stormwater Structure No.):

- No. 1541
- No. 1640
- No. 1650

- No. 1657
- No. 1670
- No. 1680
- No. 1756
- No. 1757

3.1 Sampling Method

The sediment samples from the eight (8) stormwater vaults were collected by attaching a 4-liter stainless steel beaker to a long telescoping metal pole. The beaker was attached to the pole by use of a hole drilled into the beaker and a metal clip attached to the end of the pole. The beaker was lowered to the bottom of the vault and scraped along the bottom in order to draw sediment into the beaker. When full, the beaker was raised to the surface and the contents allowed to settle. A second 4-liter stainless steel beaker was attached to the metal pole and the process repeated. After some settling of the first beaker, the top water layer was decanted back into the vault, with the remaining sediment transferred to a pre-cleaned stainless steel mixing bowl with stainless steel spoon. This process was repeated between the two (2) beakers until enough sediment was sampled.

The sediment in the mixing bowl was thoroughly homogenized by mixing with the stainless steel spoon. If present, particles greater than 1/4-inch were removed from the mixing bowl with the stainless steel spoon. The homogenized sediment mixture was then transferred to pre-cleaned laboratory sample containers. The sample containers were then placed into Ziploc bags and placed in a chilled laboratory cooler.

The hierarchy for sampling location within each vault gave hierarchy to collecting sediments as close to the final (outflow) chamber as possible. Since the outflow chamber of a vault is expected to have a greater percentage of fines in the sediment than in the first (inflow) chamber, this sample location was selected to get “worst case” sediment concentrations of target chemicals.

3.2 Sampling Equipment Decontamination

All of the stainless steel sampling equipment was precleaned at the King County Environmental Laboratory (KCEL) and wrapped in aluminum foil prior to use in the field. The only decontamination required was rinsing of the telescoping metal pole between sampling stations. The pole was rinsed by using a polypropylene squeeze bottle containing laboratory reverse osmosis (RO) water.

3.3 Sample Containers and Preservation

The following containers were used for each sample location:

- Polychlorinated Biphenyls (PCBs) – 8oz glass jar
- Semivolatile Organic Compounds (SVOCs) – 8oz glass jar
- Total Solids(TS)/Total Organic Carbon (TOC) – 4oz wide-mouth glass jar
- Metals (As/Cu/Pb/Hg/Zn) – 8oz HDPE jar
- Total Petroleum Hydrocarbons (TPH)/Diesel- and Oil-Range – 8oz glass jar

Upon collection, all samples were preserved by being placed in an insulated, chilled cooler containing ice. The samples were stored in the chilled cooler until delivery to KCEL.

3.4 Field Duplicate

One field duplicate sample was collected from Vault 1680 during the sampling event. This vault was selected because of the ease of collecting sufficient sample. The field duplicate sample was collected from the same homogenized mixing bowl as the original sample and was submitted for PCB analysis and Total Solids analysis only.

4. CHEMICAL ANALYSIS

The following analyses were conducted on each sample at KCEL:

- PCBs – EPA Method 8082
- SVOCs (PAH and Phthalates) – EPA Method 8270
- Total Solids – Standard Methods No. 2540-G
- TOC – EPA Method 9060
- Metals (As/Cu/Pb/Hg/Zn) – EPA Methods 200.8 & 245.1
- Diesel- and Oil-Range TPH – Method NWTPH-Dx

5. CHEMICAL RESULTS

The full chemical results from the stormwater sediment sampling event are provided in **Appendix A**. These results are further summarized into tabular format for target chemicals based on dry-weight results (**Table 1**) or results normalized to organic carbon (**Table 2**).

5.1 Dry-Weight Results

The dry-weight chemical results are presented in **Table 1**.

It should be noted that two samples were collected from Vault 1757. These samples were collected because of the different appearance of sediments from the middle and final (outflow) vault chambers. However, because of the nature of the sample collected from the outflow chamber (see Note “(c)” in **Table 1**), it is not considered representative of the sediment originating from KCIA runoff. The results from this particular sample are presented for the sake of completeness; however, the data from this sample will not be included in the discussions to

follow. The sediment collected from the middle chamber (see Note “(b)” in **Table 1**) is considered representative of the sediment originating from KCIA runoff.

PCBs:

Total PCB concentrations were all below 1,000 µg/kg, with the exception of the sample from Vault 1680. The original and duplicate sample values for this vault were 1,922 µg/kg and 2,108 µg/kg, respectively. The relative percent difference between these two values is 9% indicating good analytical and field precision.

The total PCB results for Vaults 1541, and 1640 were non-detect and 252 µg/kg, respectively. These vaults drain to a KCIA manhole where Seattle Public Utilities collected a sediment trap sample in March to August 2005. The result from this sediment trap sample (T5A) was 106 µg/kg (King County/Seattle, 2006).

The total PCB results for Vaults 1650, and 1657 were 717 and 243 µg/kg, respectively. These vaults drain to a KCIA manhole where Seattle Public Utilities collected a sediment trap sample in March to August 2005. The result from this sediment trap sample (T4A) was 450 µg/kg (King County/Seattle, 2006).

The total PCB results for Vaults 1670, 1680, 1756, and 1757 were 287, 1,922/2,108, 539, and 757 µg/kg, respectively. These vaults drain to two (2) KCIA manholes where Seattle Public Utilities collected sediment trap samples in March to August 2005. The results from these two sediment trap samples (T2A and T3A) were 177 and 38 µg/kg, respectively (King County/Seattle, 2006).

Phthalates:

Bis(2-ethylhexyl)phthalate: Bis(2-ethylhexyl)phthalate (BEHP) concentrations ranged from 29,400 µg/kg (Vault 1657) to 232,000 µg/kg (Vault 1757).

BEHP concentrations were generally higher toward the central portion of the airport (Vaults 1680 to 1757), with values ranging from 56,900 to 232,000 µg/kg and at the northern portion of the airport (Vaults 1541 and 1640), with values of 53,100 and 73,200 µg/kg, respectively.

BEHP concentrations were generally lower toward the north-central portion of the airport (Vaults 1650 to 1670), with values ranging from 29,400 to 39,000 µg/kg.

As a point of comparison, Seattle Public Utilities conducted sediment testing in 2003 through 2005 at private catch basins of commercial and industrial businesses in the Lower Duwamish and East Waterway drainage basins. Results for BEHP varied from a low of 88 µg/kg to a high of 160,000 µg/kg (King County/Seattle, 2005).

In November 2005, Seattle Public Utilities collected sediment samples from a stormwater oil/water separator (CB79) and a stormwater catch basin (CB80) on the Emerald Services property that abuts Slip 4. The BEHP results for these samples were 120,000 and 38,000 µg/kg, respectively (King County/Seattle, 2006).

Butylbenzylphthalate: Butylbenzylphthalate (BBzP) concentrations ranged from less than 700 µg/kg (Vault 1541) to 4,090 µg/kg (Vault 1757).

PAH:

High molecular weight polycyclic aromatic hydrocarbon (HPAH) concentrations ranged from 37,390 µg/kg (Vault 1541) to 629,900 µg/kg (Vault 1757).

HPAH concentrations were generally higher toward the central portion of the airport (Vaults 1670 to 1757), with values ranging from 257,150 to 629,900 µg/kg.

HPAH concentrations were generally lower at the northern portion of the airport (Vaults 1541 to 1657), with values ranging from 37,390 to 156,860 µg/kg, respectively. These vaults drain to a common manhole where Seattle Public Utilities collected a sediment trap sample in March to August 2005. The result from this sediment trap sample (T1) was 17,590 µg/kg (King County/Seattle, 2006).

Metals:

Copper: Copper concentrations ranged from 204 mg/kg (Vault 1657) to 1,550 mg/kg (Vault 1541).

In December 2004, Seattle Public Utilities collected a sediment sample from a stormwater catch basin (CB46 – KCIA No. 1082) located between the King County Maintenance Facility and Show Quality Metal Finishing. This catch basin collects stormwater that drains to Vault 1541. The copper result for this sample was 5,660 mg/kg (King County/Seattle, 2006).

Lead: Lead concentrations ranged from 190 mg/kg (Vault 1541) to 744 mg/kg (Vault 1650).

Zinc: Zinc concentrations ranged from 574 mg/kg (Vault 1670) to 1,880 mg/kg (Vault 1541).

General Discussion: The dry-weight metal results were compared to criteria from the Washington State Sediment Management Standards (Ch. 173-204 WAC). This regulation contains criteria based on Sediment Quality Standards (SQS) and Cleanup Screening Levels (CSL) for marine sediment. One or more sample results presented in **Table 1** or **Table 2** exceeded the SQS or CSL for copper, lead, mercury, and zinc. However, for the sake of comparison, surface sediment sampling of Slip 4 conducted in 2004 resulted in a CSL exceedance for mercury in one (1) of the four (4) locations sampled. No other SQS or CSL

exceedances were reported for the metals regulated under the Washington State Sediment Management Standards (King County/Seattle, 2006).

TPH:

Diesel-range TPH concentrations ranged from non-detect (Vault 1650) to 16,000 mg/kg (Vault 1640).

Motor oil-range TPH concentrations ranged from 3,500 mg/kg (Vault 1657) to 81,000 mg/kg (Vault 1541).

Coprostanol:

The sediment samples from Vaults 1541, 1640, and 1757 had detects of coprostanol at concentrations of 34,000 µg/kg, 25,700 µg/kg, and 1,150 µg/kg, respectively. These results are presented in **Appendix A**.

Coprostanol is a sterol found in human feces and is used as a biomarker to indicate the presence of fecal contamination.

5.2 Carbon-Normalized Results

The organic carbon-normalized chemical results are presented in **Table 2**. These carbon-normalized results are compared to criteria from the Washington State Sediment Management Standards (Ch. 173-204 WAC). This regulation contains criteria based on Sediment Quality Standards (SQS) and Cleanup Screening Levels (CSL) for marine sediment.

PCBs:

Total PCB concentrations were all below the SQS limit of 12 mg/kg-OC, with the exception of the sample from Vault 1680 with a value of 29.2 mg/kg-OC. The CSL limit is 65 mg/kg-OC.

Phthalates:

Bis(2-ethylhexyl)phthalate: BEHP concentrations ranged from 453 mg/kg-OC (Vault 1650) to 2,805 mg/kg-OC (Vault 1757). The SQS limit for BEHP is 47 mg/kg-OC and the CSL limit is 78 mg/kg-OC.

As a point of comparison, surface sediment sampling of Slip 4 conducted in 2004 resulted in SQS or CSL exceedances in two (2) of the eight (8) locations sampled for BEHP, with values of 51 and 132 mg/kg-OC (King County/Seattle, 2006).

Butylbenzylphthalate: BBzP concentrations ranged from less than 8 mg/kg-OC (Vault 1541) to 67 mg/kg-OC (Vault 1756). The SQS limit for BBzP is 4.9 mg/kg-OC and the CSL limit is 64 mg/kg-OC.

PAH:

HPAH concentrations ranged from 432 mg/kg-OC (Vault 1541) to 10,484 mg/kg-OC (Vault 1756). The SQS limit for HPAH is 960 mg/kg-OC and the CSL limit is 5,300 mg/kg-OC.

Several individual PAH exceeded either the SQS or CSL limit. See **Table 2** for further detail.

Indeno(1,2,3-cd)pyrene: Indeno(1,2,3-cd)pyrene concentrations ranged from 30 mg/kg-OC (Vault 1541) to 763 mg/kg-OC (Vault 1756). The SQS limit for indeno(1,2,3-cd)pyrene is 34 mg/kg-OC and the CSL limit is 88 mg/kg-OC.

As a point of comparison, surface sediment sampling of Slip 4 conducted in 2004 resulted in a SQS exceedance for indeno(1,2,3-cd)pyrene for one (1) of the eight (8) locations sampled for PAH. The SQS exceedance for indeno(1,2,3-cd)pyrene was 35 mg/kg-OC (at Station SG06FR), which slightly exceeded the associated SQS limit (34 mg/kg-OC). There were no other reported PAH exceedances of SQS or CSL from the 2004 Slip 4 sampling event (King County/Seattle, 2006).

6. SUMMARY

In June 2006, eight (8) stormwater vaults were sampled from the northern and central portions of KCIA that drain to Slip 4. The sediment samples collected from these vaults had concentrations of target chemicals that exceeded SQS or CSL limits of Washington State Sediment Management Standards.

The application of SQS or CSL limits to sediment in stormwater vaults is used as an aid to compare with historic surface sediment results from Slip 4. Although there were several values for metals, PAH, and phthalates that exceeded SQS or CSL limits in stormwater vault sediment samples, associated historic values in Slip 4 surface sediment samples displayed significantly lower concentrations. This could be partly accounted for by dilution from sediments from other Slip 4 sub-basins; however, another factor may be the sedimentation and oil retention features of the stormwater vaults. Therefore, caution should be applied when evaluating vault sediment concentrations in the context of sediment transport to Slip 4.

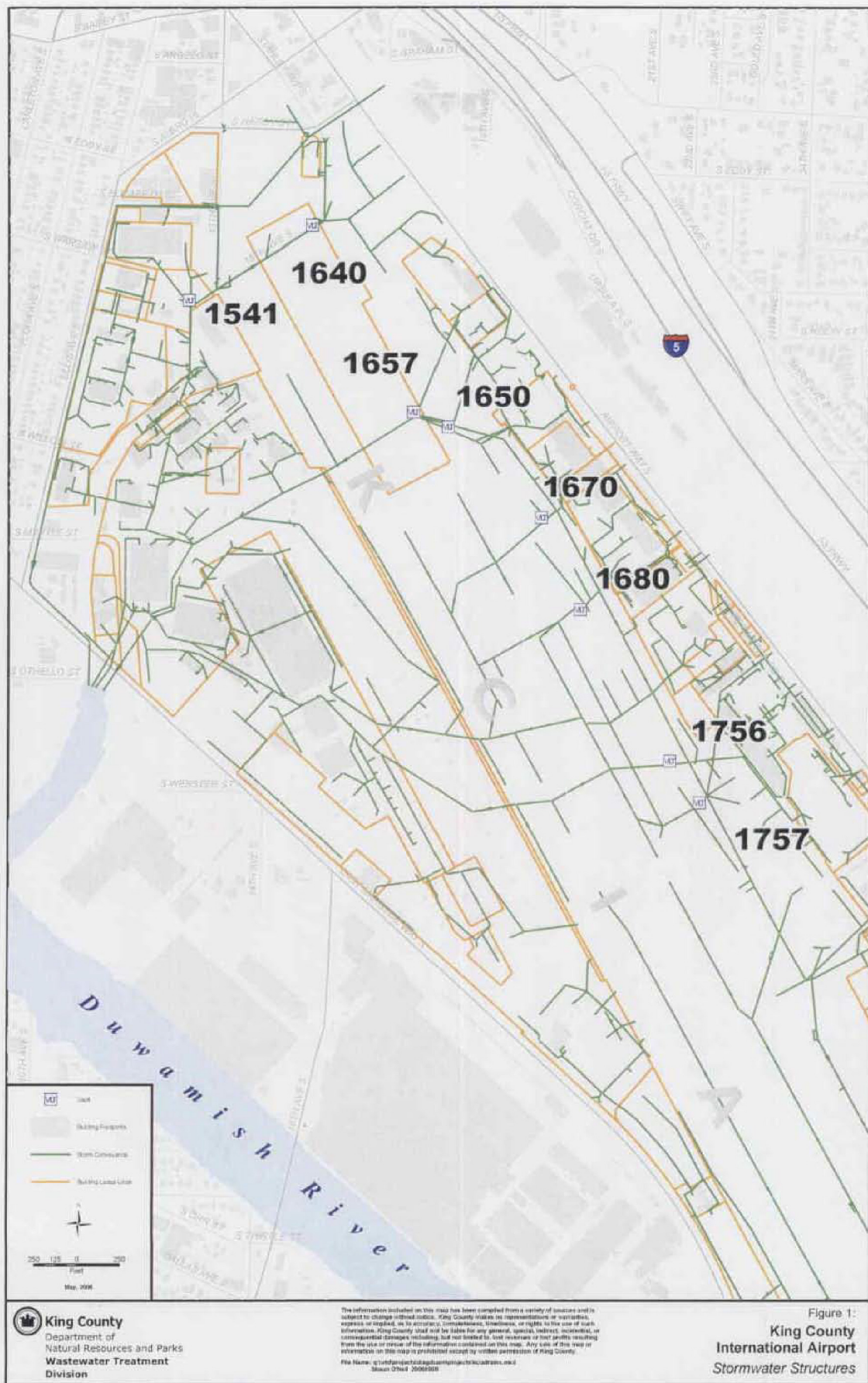
PCB concentrations in the stormwater vaults were all below SQS limits, with the exception of the sediment from one vault. As a point of comparison, historic PCB concentrations from downgradient sediment traps were generally less than the results from the stormwater vaults.

7. REFERENCES

King County/Seattle, 2005. *King County and Seattle Public Utilities Source Control Program for the Lower Duwamish – June 2005 Progress Report*. King County/Department of Natural Resources; Seattle, Washington and City of Seattle/Seattle Public Utilities; Seattle, Washington.

King County/Seattle, 2006. *Lower Duwamish Waterway Slip 4 Early Action Area –Engineering Evaluation/Cost Analysis*. Prepared by Integral Consulting, Inc. for King County/Department of Natural Resources; Seattle, Washington and City of Seattle/Seattle Public Utilities; Seattle, Washington.

FIGURES



TABLES

Table 1
King County International Airport - Stormwater Vault Sediment Results - Dry Weight Values

	1541 KCIA L39363-1	1640 KCIA L39363-2	1550 KCIA L39363-3	1657 KCIA L39363-4	1670 ^(a) KCIA L39363-5	1680 KCIA L39363-6	1680(FD) KCIA L39361-10	1756 KCIA L39363-7	1757 ^(b) KCIA L39363-8	1757 ^(c) KCIA L39366-1
Date Sampled	6/8/2006	6/7/2006	6/7/2006	6/7/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
TOC (percent)	8.65	7.2	6.98	3.98	6.27	6.59	-	5.27	8.27	0.45
Metals (mg/kg DW)										
As	9.4	23	34.4	14	9.3	29.3	-	12	16	4 U
Cu	1,550	233	567	204	227	284	-	286	301	31
Pb	190	463	744	263	396	420	-	237	385	10
Hg	0.13	0.21	0.24	0.20	0.30	0.24	-	0.54	0.24	0.04 U
Zn	1,880	1,250	1,810	1,620	574	1,240	-	1,580	813	40
LPAH (µg/kg DW)										
Acenaphthene	820 U	1,100 U	1,600 U	870 U	1,000	1,500 U	-	1,600 U	1,300 U	49 U
Acenaphthylene	1,800 U	2,300 U	3,500 U	1,900 U	1,300 U	3,300 U	-	3,500 U	2,800 U	100 U
Anthracene	470 U	1,200	990	840	4,170	1,910	-	4,390	6,350	63
Fluorene	1,500 U	2,000 U	3,000 U	1,600 U	1,700	2,900 U	-	3,000 U	2,400 U	90 U
2-Methylnaphthalene	1,600 U	2,200 U	3,300 U	1,700 U	1,200 U	3,100 U	-	3,300 U	2,600 U	97 U
Naphthalene	1,600 U	2,200 U	3,300 U	1,700 U	1,200 U	3,100 U	-	3,300 U	2,600 U	97 U
Phenanthrene	3,260	13,700	6,980	6,580	20,900	19,100	-	33,700	47,200	703
Total LPAH	3,260	14,900	7,970	7,420	27,770	21,010	-	38,090	53,560	766
HPAH (µg/kg DW)										
Benzo(a)anthracene	2,230	7,180	4,530	3,730	19,600	11,600	-	30,800	35,500	495
Benzo(a)pyrene	2,770	11,500	7,150	6,240	26,100	19,000	-	42,600	50,000	741
Benzo(b)fluoranthene	4,520	20,500	10,900	10,400	40,700	30,500	-	77,800	83,200	1,310
Benzo(k)fluoranthene	3,280	13,900	10,600	9,910	26,700	30,400	-	58,200	58,900	861
Benzo(g,h,i)perylene	3,140	11,900	7,270	6,610	25,000	20,300	-	42,600	44,800	736
Chrysene	4,690	18,900	10,800	9,970	32,200	31,300	-	67,300	70,100	1,010
Dibenzo(a,h)anthracene	820 U	3,100	2,300	1,600	7,480	4,060	-	10,400	12,900	184
Fluoranthene	7,420	33,900	18,900	17,100	52,500	53,300	-	106,000	132,000	1,910
Indeno(1,2,3-cd)pyrene	2,570	10,300	6,570	5,810	23,300	18,200	-	40,200	42,500	684
Pyrene	6,770	26,000	14,100	12,800	44,500	38,500	-	76,600	100,000	1,450
Total HPAH	37,390	156,860	91,320	84,170	298,080	257,150	-	552,500	629,900	9,381
Phthalates (µg/kg DW)										
Bis(2-ethylhexyl)phthalate	53,100	73,200	31,600	29,400	39,000	64,300	-	56,900	232,000	63,900
Butylbenzylphthalate	700 U	2,040	3,130	1,490	2,610	3,040	-	3,610	4,090	115
Diethylphthalate	700 U	930 U	1,400 U	750 U	510 U	1,300 U	-	1,400 U	1,100 U	42 U
Dimethylphthalate	1,300 U	1,700 U	2,600 U	1,400 U	930 U	2,400 U	-	2,600 U	2,100 U	76 U
Di-n-butylphthalate	590 U	780 U	3,150	710	420 U	2,810	-	1,200 U	930 U	35 U
Di-n-octylphthalate	940 U	1,200 U	1,900 U	990 U	680 U	1,800 U	-	1,900 U	1,500 U	110
PCBs (µg/kg DW)										
Aroclor 1016	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1221	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1232	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1242	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1248	40 U	51 U	248	71	31 U	725	795	80 U	97	22 U
Aroclor 1254	40 U	152	203	75	115	1,040	1,150	274	328	22 U
Aroclor 1260	40 U	100	266	97	172	157	163	265	332	22 U
Total PCBs	ND	252	717	243	287	1,922	2,108	539	757	ND
TPH (mg/kg)										
Diesel	11,000	16,000	ND	940	2,000	2,100	-	8,100	6,300	1,600
Motor Oil	81,000	8,800	10,000	3,500	8,500	8,200	-	25,000	13,000	ND

Notes: Detected values shown in bold.
Except where noted, all samples collected from final (outflow) chamber of vault.
(a) = Sample collected from first (inflow) chamber of a two-chamber vault. Insufficient sediment in second (outflow) chamber.
(b) = Sample collected from the middle chamber of vault. Sediment sample appeared normal.
(c) = Sample collected from the last (outflow) chamber of vault. Sediment sample appeared to be a greyish-colored slurry.
DW = Dry weight
FD = Field duplicate
ND = Not detected
U = Chemical not detected at reported concentration.

Table 2
King County International Airport - Stormwater Vault Sediment Results - Comparison to Sediment Management Standards

SQS		CSL	1541 KCIA L39363-1	1640 KCIA L39363-2	1650 KCIA L39363-3	1657 KCIA L39363-4	1670 ^(a) KCIA L39363-5	1680 KCIA L39363-6	1756 KCIA L39363-7	1757 ^(b) KCIA L39363-8	1757 ^(c) KCIA L39363-9
Date Sampled			6/8/2006	6/7/2006	6/7/2006	6/7/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
TOC (percent)			8.65	7.2	6.98	3.98	6.27	6.59	5.27	8.27	0.45
Metals (mg/kg DW)											
As	57	93	9.4	23	34.4	14	9.3	29.3	12	16	4 U
Cu	390	390	1,550	233	567	204	227	284	286	301	31
Pb	450	530	190	463	744	263	396	420	237	385	10
Hg	0.41	0.59	0.13	0.21	0.24	0.20	0.30	0.24	0.54	0.24	0.04 U
Zn	410	960	1,880	1,250	1,810	1,620	574	1,240	1,580	813	40
LPAH (mg/kg OC)											
Acenaphthene	16	57	9 U	15 U	23 U	22 U	16	23 U	30 U	16 U	11 U
Acenaphthylene	66	66	21 U	32 U	50 U	48 U	21 U	50 U	66 U	34 U	22 U
Anthracene	220	1,200	5 U	17	14	21	67	29	83	77	14
Fluorene	23	79	17 U	28 U	43 U	40 U	27	44 U	57 U	29 U	20 U
2-Methylnaphthalene	38	64	18 U	31 U	47 U	43 U	19 U	47 U	63 U	31 U	22 U
Naphthalene	99	170	18 U	31 U	47 U	43 U	19 U	47 U	63 U	31 U	22 U
Phenanthrene	100	480	38	190	100	165	333	290	639	571	156
Total LPAH	370	780	38	207	114	186	443	319	723	648	170
HPAH (mg/kg OC)											
Benzo(a)anthracene	110	270	26	99	65	94	313	176	584	429	110
Benzo(a)pyrene	99	210	32	160	102	157	416	288	808	605	164
Benzo(b)fluoranthene ^(d)	230	450	52	285	143	261	649	463	1,476	1,006	290
Benzo(k)fluoranthene	-	-	38	193	152	249	426	481	1,104	712	191
Benzo(g,h,i)perylene	31	78	36	165	104	166	399	308	808	542	163
Chrysene	110	460	54	263	155	251	514	475	1,277	848	224
Dibenzo(a,h)anthracene	12	33	9 U	43	33	40	119	61	197	156	41
Fluoranthene	160	1,200	86	467	258	430	837	809	2,011	1,596	424
Indeno(1,2,3-cd)pyrene	34	88	30	143	94	146	372	276	763	514	152
Pyrene	1,000	1,400	78	361	202	322	710	584	1,454	1,209	322
Total HPAH	960	5,300	432	2,179	1,308	2,115	4,754	3,902	10,484	7,617	2,080
Phthalates (mg/kg OC)											
Bis(2-ethylhexyl)phthalate	47	78	614	1,017	453	739	622	976	1,080	2,805	14,169
Butylbenzylphthalate	4.9	64	8 U	28	45	37	42	46	67	49	25
Diethylphthalate	61	110	8 U	13 U	20 U	19 U	8 U	20 U	27 U	13 U	9 U
Dimethylphthalate	53	53	15 U	24 U	37 U	35 U	15 U	36 U	49 U	25 U	17 U
Di-n-butylphthalate	220	1,700	7 U	11 U	45	18	7 U	43	23 U	11 U	9 U
Di-n-octylphthalate	58	4,500	11 U	17 U	27 U	25 U	11 U	27 U	36 U	18 U	24
PCBs (mg/kg OC)											
Aroclor 1016	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1221	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1232	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1242	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1248	-	-	0.5 U	0.7 U	3.6	1.8	0.5 U	11.0	1.5 U	1.2	4.9 U
Aroclor 1254	-	-	0.5 U	2.1	2.9	1.9	1.8	15.8	5.2	4.0	4.9 U
Aroclor 1260	-	-	0.5 U	1.4	3.8	2.4	2.7	2.4	5.0	4.0	4.9 U
Total PCBs	12	65	ND	3.5	10.3	6.1	4.6	29.2	10.2	9.2	ND
TPH (mg/kg)											
MTCA A											
Diesel	2,000		11,000	16,000	ND	940	2,000	2,100	8,100	6,300	1,600
Motor Oil	2,000		81,000	8,800	10,000	3,500	8,500	8,200	25,000	13,000	ND

- Notes:**
- Detected values shown in **bold**
- Except where noted, all samples collected from final (outflow) chamber of vault.
- (a) = Sample collected from first (inflow) chamber of a two-chamber vault. Insufficient sediment in second (outflow) chamber.
- (b) = Sample collected from the middle chamber of vault. Sediment sample appeared normal.
- (c) = Sample collected from the last (outflow) chamber of vault. Sediment sample appeared to be a greyish-colored slurry.
- (d) = Standard based on total benzofluoranthenes
- DW = Dry weight
- FD = Field duplicate
- ND = Not detected
- OC = Organic carbon
- U = Chemical not detected at reported concentration.
- ## = Exceeds Sediment Quality Standards (SQS)
- ### = Exceeds Cleanup Screening Levels (CSL) or MTCA Method A soil cleanup level for industrial use.

APPENDIX A
ANALYTICAL DATA

King County Environmental Lab Analytical Report

PROJECT: 421168-40

Locator: KCIA_V_1541
 Descrip: KC AIRPORT STORM W
 Sampled: Jun 08, 2006
 Lab ID: L39361-1
 Matrix: IN-LINESED
 % Solids: 32.3

Locator: KCIA_V_1040
 Descrip: KC AIRPORT STORM W
 Sampled: Jun 07, 2006
 Lab ID: L39361-2
 Matrix: IN-LINESED
 % Solids: 25.4

Locator: KCIA_V_1650
 Descrip: KC AIRPORT STORM W
 Sampled: Jun 07, 2006
 Lab ID: L39361-3
 Matrix: IN-LINESED
 % Solids: 17.8

Locator: KCIA_V_1657
 Descrip: KC AIRPORT STORM W
 Sampled: Jun 07, 2006
 Lab ID: L39361-4
 Matrix: IN-LINESED
 % Solids: 32.2

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
COMBINED LABS															
M=Cv SM2540-G (03-01-007-002)															
Total Solids *	32.3		0.005	0.01	%	25.4		0.005	0.01	%	17.8		0.005	0.01	%
M=OR EPA 3550B/0002 (7-3-03-002)															
Aroclor 1016		<MDL	40	82.7	ug/Kg		<MDL	51	105	ug/Kg		<MDL	73	150	ug/Kg
Aroclor 1221		<MDL	40	82.7	ug/Kg		<MDL	51	105	ug/Kg		<MDL	73	150	ug/Kg
Aroclor 1232		<MDL	40	82.7	ug/Kg		<MDL	51	105	ug/Kg		<MDL	73	150	ug/Kg
Aroclor 1242		<MDL	40	82.7	ug/Kg		<MDL	51	105	ug/Kg		<MDL	73	150	ug/Kg
Aroclor 1248		<MDL	40	82.7	ug/Kg		<MDL	51	105	ug/Kg		<MDL	73	150	ug/Kg
Aroclor 1254		<MDL	40	82.7	ug/Kg	152		51	105	ug/Kg	248		73	150	ug/Kg
Aroclor 1260		<MDL	40	82.7	ug/Kg	100	<RDL	51	105	ug/Kg	203		73	150	ug/Kg
											266		73	150	ug/Kg

* Not converted to dry weight basis for this parameter

King County Environmental Lab Analytical Report

PROJECT: 421168-40

Locator: KCIA_V_1670
 Descrip: KC AIRPORT STORM W
 Sampled: Jun 06, 2006
 Lab ID: L39361-5
 Matrix: IN-LINESED
 % Solids: 42.2

Locator: KCIA_V_1680
 Descrip: KC AIRPORT STORM W
 Sampled: Jun 06, 2006
 Lab ID: L39361-6
 Matrix: IN-LINESED
 % Solids: 18.2

Locator: KCIA_V_1756
 Descrip: KC AIRPORT STORM W
 Sampled: Jun 06, 2006
 Lab ID: L39361-7
 Matrix: IN-LINESED
 % Solids: 16.2

Locator: KCIA_V_1757
 Descrip: KC AIRPORT STORM W
 Sampled: Jun 06, 2006
 Lab ID: L39361-8
 Matrix: IN-LINESED
 % Solids: 21.6

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
COMBINED LABS															
M=CV SM2540-G (03-01-007-002)															
Total Solids *	42.2		0.005	0.01	%	18.2		0.005	0.01	%	16.2		0.005	0.01	%
M=OR EPA 3650B8082 (7-3-03-002)															
Aroclor 1016		<MDL	31	63.3	ug/Kg		<MDL	71	147	ug/Kg		<MDL	80	165	ug/Kg
Aroclor 1221		<MDL	31	63.3	ug/Kg		<MDL	71	147	ug/Kg		<MDL	80	165	ug/Kg
Aroclor 1232		<MDL	31	63.3	ug/Kg		<MDL	71	147	ug/Kg		<MDL	80	165	ug/Kg
Aroclor 1242		<MDL	31	63.3	ug/Kg		<MDL	71	147	ug/Kg		<MDL	80	165	ug/Kg
Aroclor 1248		<MDL	31	63.3	ug/Kg	725		71	147	ug/Kg		<MDL	80	165	ug/Kg
Aroclor 1254	115		31	63.3	ug/Kg	1040		71	147	ug/Kg	274		80	165	ug/Kg
Aroclor 1260	172		31	63.3	ug/Kg	157		71	147	ug/Kg	265		80	165	ug/Kg
* Not converted to dry weight basis for this parameter															

King County Environmental Lab Analytical Report

PROJECT: 421168-40

Locator: KCIA_V_1680
Descrp: KC AIRPORT STORM W
Sampled: Jun 06, 2006
Lab ID: L39361-10
Matrix: IN-LINESED
% Solids: 18.5

Locator: KCIA_V_1757
Descrp: KC AIRPORT STORM W
Sampled: Jun 06, 2006
Lab ID: L39395-1
Matrix: IN-LINESED
% Solids: 58.6

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
- Dry Weight Basis										
COMBINED LABS										
M-CV SM2540-3 (03-01-007-002)										
Total Solids *	18.5		0.005	0.01	%	58.6		0.005	0.01	%
M-OR EPA 3550B/002 (7-3-03-002)										
Aroclor 1016		<MDL	70	144	ug/Kg		<MDL	22	45.6	ug/Kg
Aroclor 1221		<MDL	70	144	ug/Kg		<MDL	22	45.6	ug/Kg
Aroclor 1232		<MDL	70	144	ug/Kg		<MDL	22	45.6	ug/Kg
Aroclor 1242		<MDL	70	144	ug/Kg		<MDL	22	45.6	ug/Kg
Aroclor 1248	795		70	144	ug/Kg		<MDL	22	45.6	ug/Kg
Aroclor 1254	1150		70	144	ug/Kg		<MDL	22	45.6	ug/Kg
Aroclor 1260	163		70	144	ug/Kg		<MDL	22	45.6	ug/Kg

* Not converted to dry weight basis for this parameter

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PROJECT: 421168-40

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PROJECT: 421168-40

Parameters	KCIA_V_1541					KCIA_V_1540					KCIA_V_1650					KCIA_V_1657				
	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
- Dry Weight Basis																				
CONTAMINATED LABS																				
Benzoic Acid		<MDL	1600	7830 ug/Kg			<MDL	2100	10400 ug/Kg			<MDL	3100	15500 ug/Kg			<MDL	1600	8290 ug/Kg	
Benzyl Alcohol		<MDL	700	1410 ug/Kg			<MDL	930	1870 ug/Kg			<MDL	1400	2790 ug/Kg			<MDL	750	1490 ug/Kg	
Benzyl Butyl Phthalate		<MDL	700	1410 ug/Kg		2040		930	1870 ug/Kg				1400	2790 ug/Kg		3130		<MDL	750	1490 ug/Kg
Bis(2-Chloroethoxy)Methane		<MDL	2000	3980 ug/Kg			<MDL	2600	5290 ug/Kg			<MDL	4000	7910 ug/Kg			<MDL	2100	4220 ug/Kg	
Bis(2-Chloroethyl)Ether		<MDL	1800	3520 ug/Kg			<MDL	2300	4670 ug/Kg			<MDL	3500	6980 ug/Kg			<MDL	1900	3730 ug/Kg	
Bis(2-Chloroisopropyl)Ether		<MDL	1800	3520 ug/Kg			<MDL	2300	4670 ug/Kg			<MDL	3500	6980 ug/Kg			<MDL	1900	3730 ug/Kg	
Bis(2-Ethylhexyl)Phthalate	53100		790	1640 ug/Kg		73200		1100	2180 ug/Kg				1800	3290 ug/Kg		31600		<MDL	840	1740 ug/Kg
Caffeine		<MDL	700	1410 ug/Kg		3320		930	1870 ug/Kg			<MDL	1400	2790 ug/Kg			<MDL	750	1490 ug/Kg	
Carbazole		<MDL	820	1640 ug/Kg				1100	2180 ug/Kg			<MDL	1600	3260 ug/Kg		2000	<MDL	870	1740 ug/Kg	
Chrysene	4690		470	938 ug/Kg		18900		620	1250 ug/Kg				930	1880 ug/Kg		10800		<MDL	500	994 ug/Kg
Coprostanol	34000		1600	3280 ug/Kg		25700		2200	4360 ug/Kg			<MDL	3300	6510 ug/Kg			<MDL	1700	3480 ug/Kg	
Dibenz(a,h)anthracene		<MDL	820	1640 ug/Kg		3100		1100	2180 ug/Kg			<MDL	1600	3260 ug/Kg		2300	<MDL	870	1740 ug/Kg	
Dibenzofuran		<MDL	1600	3280 ug/Kg			<MDL	2200	4360 ug/Kg			<MDL	3300	6510 ug/Kg			<MDL	1700	3480 ug/Kg	
Diethyl Phthalate		<MDL	700	1410 ug/Kg			<MDL	930	1870 ug/Kg			<MDL	1400	2790 ug/Kg			<MDL	750	1490 ug/Kg	
Dimethyl Phthalate		<MDL	1300	2580 ug/Kg			<MDL	1700	3420 ug/Kg			<MDL	2600	5120 ug/Kg			<MDL	1400	2730 ug/Kg	
Di-N-Butyl Phthalate		<MDL	590	1170 ug/Kg			<MDL	780	1560 ug/Kg				1200	2330 ug/Kg		3150	<MDL	620	1240 ug/Kg	
Di-N-Octyl Phthalate		<MDL	940	1880 ug/Kg			<MDL	1200	2490 ug/Kg			<MDL	1900	3720 ug/Kg			<MDL	980	1990 ug/Kg	
Fluoranthene	7420		940	1880 ug/Kg		33600		1200	2490 ug/Kg			<MDL	1900	3720 ug/Kg		18000	<MDL	1600	2730 ug/Kg	
Fluorene		<MDL	1500	2580 ug/Kg			<MDL	2000	3420 ug/Kg			<MDL	3000	5120 ug/Kg			<MDL	1600	2730 ug/Kg	
Hexachlorobenzene		<MDL	79	156 ug/Kg			<MDL	110	207 ug/Kg			<MDL	160	309 ug/Kg			<MDL	84	165 ug/Kg	
Hexachlorobutadiene		<MDL	88	176 ug/Kg			<MDL	120	233 ug/Kg			<MDL	170	349 ug/Kg			<MDL	93	186 ug/Kg	
Hexachloroethane		<MDL	1800	3520 ug/Kg			<MDL	2300	4670 ug/Kg			<MDL	3500	6980 ug/Kg			<MDL	1900	3730 ug/Kg	
Indeno(1,2,3-Cd)Pyrene	2570		1100	2110 ug/Kg		10300		1400	2800 ug/Kg				2100	4190 ug/Kg		6570	<MDL	1100	2240 ug/Kg	
Isophorone		<MDL	2200	4460 ug/Kg			<MDL	3000	5910 ug/Kg			<MDL	4400	8840 ug/Kg			<MDL	2400	4720 ug/Kg	
Naphthalene		<MDL	1600	3280 ug/Kg			<MDL	2200	4360 ug/Kg			<MDL	3300	6510 ug/Kg			<MDL	1700	3480 ug/Kg	
Nitrobenzene		<MDL	1900	3750 ug/Kg			<MDL	2500	4980 ug/Kg			<MDL	3700	7440 ug/Kg			<MDL	2000	3980 ug/Kg	
N-Nitrosodimethylamine		<MDL	2300	4590 ug/Kg			<MDL	3100	6230 ug/Kg			<MDL	4700	9300 ug/Kg			<MDL	2500	4970 ug/Kg	
N-Nitrosodi-N-Propylamine		<MDL	1100	2110 ug/Kg			<MDL	1400	2800 ug/Kg			<MDL	2100	4190 ug/Kg			<MDL	1100	2240 ug/Kg	
N-Nitrosodiphenylamine		<MDL	2300	4590 ug/Kg			<MDL	3100	6230 ug/Kg			<MDL	4700	9300 ug/Kg			<MDL	2500	4970 ug/Kg	
Pentachlorophenol		<MDL	790	3140 ug/Kg			<MDL	1100	4160 ug/Kg			<MDL	1600	6220 ug/Kg			<MDL	840	3320 ug/Kg	
Phenanthrene	3260		470	938 ug/Kg		13700		620	1250 ug/Kg				930	1860 ug/Kg		6980	<MDL	500	994 ug/Kg	
Phenol		<MDL	1100	2110 ug/Kg			<MDL	1400	2800 ug/Kg			<MDL	2100	4190 ug/Kg			<MDL	1100	2240 ug/Kg	
Pyrene	6770		470	938 ug/Kg		26000		820	1250 ug/Kg				930	1860 ug/Kg		14100	<MDL	500	994 ug/Kg	
Pyridine		<MDL	3200	6250 ug/Kg			<MDL	4300	8290 ug/Kg			<MDL	6400	12400 ug/Kg			<MDL	3400	6610 ug/Kg	
M-OR WDOE WYTHPHOX (7-3-de-001)																				
Diesel Range (>C12-C24)	11000	H.TA	73	73 mg/Kg		16000	H.TA	97	97 mg/Kg			10000	H.TA	150	150 mg/Kg		940	H.TA	78	78 mg/Kg
Lube Oil Range (>C24)	81000	H.TA	73	73 mg/Kg		88000	H.TA	97	97 mg/Kg			35000	H.TA	78	78 mg/Kg		3500	H.TA	78	78 mg/Kg
* Not converted to dry weight basis for this parameter																				

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PROJECT: 421168-40

Locator: KCIA_V_1670
 Descr: KC AIRPORT STORM W
 Client Loc: KCIA-1670-060606
 Sampled: Jun 06, 2006
 Lab ID: L39363-5
 Matrix: IN-LINESED
 % Solids: 47.2

Locator: KCIA_V_1680
 Descr: KC AIRPORT STORM W
 Client Loc: KCIA-1680-060606
 Sampled: Jun 06, 2006
 Lab ID: L39363-6
 Matrix: IN-LINESED
 % Solids: 18.2

Locator: KCIA_V_1766
 Descr: KC AIRPORT STORM W
 Client Loc: KCIA-1766-060606
 Sampled: Jun 06, 2006
 Lab ID: L39363-7
 Matrix: IN-LINESED
 % Solids: 17.1

Locator: KCIA_V_1757
 Descr: KC AIRPORT STORM W
 Client Loc: KCIA-1757-060606M
 Sampled: Jun 06, 2006
 Lab ID: L39363-8
 Matrix: IN-LINESED
 % Solids: 21.4

Parameters

Parameters	- Dry Weight Basis				Units	- Dry Weight Basis				Units	- Dry Weight Basis				Units	- Dry Weight Basis				Units
	Value	Qual	MDL	RDL		Value	Qual	MDL	RDL		Value	Qual	MDL	RDL		Value	Qual	MDL	RDL	
COMBINED LABS																				
M-CV EPA 8060-PSEP96 (03-04-002-003)																				
Total Organic Carbon																				
62700	4900	9640	mg/Kg		65900	5400	10800	mg/Kg		52700	6400	12900	mg/Kg		82700	7000	14300	mg/Kg		
47.2	0.005	0.01	%		18.2	0.005	0.01	%		17.1	0.005	0.01	%		21.4	0.005	0.01	%		
M-CV SW1540-G (03-01-007-402)																				
Total Solids *																				
M-MT EPA 7471A (06-01-004-003)																				
Mercury, Total, CVAA																				
0.3	<RDL	0.042	0.428	mg/Kg	0.24	<RDL	0.11	1.12	mg/Kg	0.54	<RDL	0.12	1.19	mg/Kg	0.24	<RDL	0.093	0.925	mg/Kg	
M-MT EPA 3050A060108 (06-02-004-002)																				
Arsenic, Total, ICP																				
9.3	<RDL	3.6	17.6	mg/Kg	29.3	4.6	22.7	mg/Kg		12	<RDL	4.8	24	mg/Kg	16	<RDL	4.7	23.3	mg/Kg	
227	0.28	1.41	mg/Kg		284	0.36	1.81	mg/Kg		286	0.39	1.92	mg/Kg		301	0.37	1.86	mg/Kg		
396	2.1	10.6	mg/Kg		420	2.7	13.6	mg/Kg		237	2.9	14.4	mg/Kg		385	2.8	14	mg/Kg		
574	0.36	1.76	mg/Kg		1240	0.46	2.27	mg/Kg		1580	0.48	2.4	mg/Kg		813	0.47	2.33	mg/Kg		
M-OR EPA 3550B-270C (7-3-01-004)																				
1,2,4-Trichlorobenzene																				
	<MDL	23	44.9	ug/Kg		<MDL	60	116	ug/Kg		<MDL	64	124	ug/Kg		<MDL	51	99.1	ug/Kg	
1,2-Dichlorobenzene																				
	<MDL	23	44.9	ug/Kg		<MDL	60	116	ug/Kg		<MDL	64	124	ug/Kg		<MDL	51	99.1	ug/Kg	
2-Diphenylhydrazine																				
	<MDL	850	1690	ug/Kg		<MDL	2200	4400	ug/Kg		<MDL	2300	4680	ug/Kg		<MDL	1900	3740	ug/Kg	
3-Dichlorobenzene																				
	<MDL	23	44.9	ug/Kg		<MDL	60	116	ug/Kg		<MDL	64	124	ug/Kg		<MDL	51	99.1	ug/Kg	
4-Dichlorobenzene																				
	<MDL	11	22.5	ug/Kg		<MDL	29	58.2	ug/Kg		<MDL	31	62	ug/Kg		<MDL	25	49.5	ug/Kg	
4,5-Trichlorophenol																				
	<MDL	1000	2030	ug/Kg		<MDL	2600	5270	ug/Kg		<MDL	2800	5610	ug/Kg		<MDL	2200	4490	ug/Kg	
4,6-Trichlorophenol																				
	<MDL	1100	2200	ug/Kg		<MDL	2900	5710	ug/Kg		<MDL	3000	6080	ug/Kg		<MDL	2400	4860	ug/Kg	
4,4-Dichlorophenol																				
	<MDL	1400	2710	ug/Kg		<MDL	3500	7030	ug/Kg		<MDL	3700	7490	ug/Kg		<MDL	3000	5980	ug/Kg	
4,4-Dimethylphenol																				
	<MDL	590	1190	ug/Kg		<MDL	1500	3080	ug/Kg		<MDL	1600	3270	ug/Kg		<MDL	1300	2620	ug/Kg	
4-Dinitrotoluene																				
	<MDL	250	508	ug/Kg		<MDL	660	1320	ug/Kg		<MDL	700	1400	ug/Kg		<MDL	560	1120	ug/Kg	
6-Dinitrotoluene																				
	<MDL	850	1690	ug/Kg		<MDL	2200	4400	ug/Kg		<MDL	2300	4680	ug/Kg		<MDL	1900	3740	ug/Kg	
4-Chloronaphthalene																				
	<MDL	1400	2710	ug/Kg		<MDL	3500	7030	ug/Kg		<MDL	3700	7490	ug/Kg		<MDL	3000	5980	ug/Kg	
4-Chlorophenol																				
	<MDL	680	1360	ug/Kg		<MDL	1800	3520	ug/Kg		<MDL	1900	3740	ug/Kg		<MDL	1500	2990	ug/Kg	
2-Methylnaphthalene																				
	<MDL	1200	2370	ug/Kg		<MDL	3100	6150	ug/Kg		<MDL	3300	6550	ug/Kg		<MDL	2600	5230	ug/Kg	
2-Methylphenol																				
	<MDL	1400	2710	ug/Kg		<MDL	3500	7030	ug/Kg		<MDL	3700	7490	ug/Kg		<MDL	3000	5980	ug/Kg	
4-Nitrophenol																				
	<MDL	1300	2540	ug/Kg		<MDL	3300	6590	ug/Kg		<MDL	3500	7020	ug/Kg		<MDL	2800	5610	ug/Kg	
4-Bromophenyl Phenyl Ether																				
	<MDL	760	1530	ug/Kg		<MDL	2000	3960	ug/Kg		<MDL	2100	4210	ug/Kg		<MDL	1700	3360	ug/Kg	
4-Chlorophenyl Phenyl Ether																				
1700	<RDL	1400	2710	ug/Kg		<MDL	2900	5710	ug/Kg		<MDL	3000	6080	ug/Kg		<MDL	2400	4860	ug/Kg	
2-Methylphenol																				
1000	<RDL	590	1190	ug/Kg		<MDL	1500	3080	ug/Kg		<MDL	1600	3270	ug/Kg		<MDL	1300	2620	ug/Kg	
Acenaphthene																				
<MDL	<MDL	1300	2540	ug/Kg		<MDL	3300	6590	ug/Kg		<MDL	3500	7020	ug/Kg		<MDL	2800	5610	ug/Kg	
Acenaphthylene																				
<MDL	<MDL	1600	3220	ug/Kg		<MDL	4200	8350	ug/Kg		<MDL	4400	8890	ug/Kg		<MDL	3600	7100	ug/Kg	
4170		340	678	ug/Kg		1910	880	1760	ug/Kg		4390	940	1870	ug/Kg		6360	750	1500	ug/Kg	
Anthracene																				
19600		170	339	ug/Kg		11600	440	879	ug/Kg		30800	470	936	ug/Kg		35500	370	748	ug/Kg	
Benzo(a)anthracene																				
26100		250	508	ug/Kg		19000	660	1320	ug/Kg		42600	700	1400	ug/Kg		50000	560	1120	ug/Kg	
Benzo(b)fluoranthene																				
40700		250	508	ug/Kg		30500	660	1320	ug/Kg		77800	700	1400	ug/Kg		83200	560	1120	ug/Kg	
Benzo(g,h,i)perylene																				
25000		680	1360	ug/Kg		20300	1800	3520	ug/Kg		42800	1900	3740	ug/Kg		44800	1500	2990	ug/Kg	
Benzo(k)fluoranthene																				
26700		250	508	ug/Kg		30400	660	1320	ug/Kg		58200	700	1400	ug/Kg		59900	560	1120	ug/Kg	

PROJECT: 421168-40

King County Environmental Lab Analytical Report

Parameters	KCIA_V_1670					KCIA_V_1880					KCIA_V_1756					KCIA_V_1757				
	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
- Dry Weight Basis																				
COMBINED LABS																				
Benzic Acid																				
Benzyl Alcohol																				
Benzyl Butyl Phthalate	2610																			
Bis(2-Chloroethoxy)Methane																				
Bis(2-Chloroethyl)Ether																				
Bis(2-Chloroisopropyl)Ether	39000																			
Bis(2-Ethylhexyl)Phthalate																				
Caffeine																				
Carbazole	5610																			
Chrysene	32200																			
Coprostano																				
Dibenz(a,h)anthracene	7480																			
Dibenzofuran	1400																			
Dibenzophthalate																				
Dimethyl Phthalate																				
Di-N-Butyl Phthalate																				
Di-N-Octyl Phthalate																				
Fluoranthene	52500																			
Fluorene	1700																			
Hexachlorobenzene																				
Hexachlorobutadiene																				
Hexachloroethane																				
Indeno(1,2,3-Cd)Pyrene	23300																			
Isophorone																				
Naphthalene																				
Nitrobenzene																				
N-Nitrosodimethylamine																				
N-Nitrosodiethylamine																				
N-Nitrosodiphenylamine																				
Pentachlorophenol	20900																			
Phenanthrene																				
Phenol																				
Pyrene	44500																			
Pyridine																				
M-OR WDOE NWPH-DX (7-3-06-001)																				
Diesel Range (>C12-C24)	2000	H.T.A	53	53	mg/Kg	2100	H.T.A	140	140	mg/Kg	8100	H.T.A	150	150	mg/Kg	6300	H.T.A	120	120	mg/Kg
Lube Oil Range (>C24)	8500	H.T.A	53	53	mg/Kg	8200	H.T.A	140	140	mg/Kg	25000	H.T.A	150	150	mg/Kg	13000	H.T.A	120	120	mg/Kg
* Not converted to dry weight basis for this parameter																				

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SEA427172

King County Environmental Lab Analytical Report

PROJECT: 421168-40

Location: KCIA_V_1757
 Description: KC AIRPORT STORM W
 Client Loc: KCIA-1757-060606E
 Sampled: Jun 06, 2006
 Lab ID: L39396-1
 Matrix: IN-LINESED
 % Solids: 57.6

Parameters	Value	Qual	MDL	RDL	Units
COMBINED LABS					
M=CVEPA 9060-PSEP86 (01-24-002-003)					
Total Organic Carbon	4510		1000	2080	mg/Kg
M=CVE 9M2540-G (03-01-007-002)					
Total Solids *	57.6		0.005	0.01	%
M=MT EPA 7471A (08-01-004-003)					
Mercury, Total, CVAA					
M=MT EPA 3050A-6108 (06-02-004-002)					
Arsenic, Total, ICP					
Copper, Total, ICP	30.6		0.35	1.74	mg/Kg
Lead, Total, ICP	9.5		2.0	13.1	mg/Kg
Zinc, Total, ICP	40.3		0.43	2.19	mg/Kg
M=OR EPA 3506B-27HC (7-1-01-004)					
1,2,4-Trichlorobenzene					
1,2-Dichlorobenzene					
1,2-Diphenylhydrazine					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					
2,4,5-Trichlorophenol					
2,4,6-Trichlorophenol					
2,4-Dichlorophenol					
2,4-Dimethylphenol					
2,4-Dinitrotoluene					
2,6-Dinitrotoluene					
2-Chloronaphthalene					
2-Chlorophenol					
2-Methyl-naphthalene					
2-Methylphenol					
2-Nitrophenol					
4-Bromophenyl Phenyl Ether					
4-Chlorophenyl Phenyl Ether					
4-Methylphenol					
Acenaphthene					
Acenaphthylene					
Aniline					
Anthracene	62.8		28	55.5	ug/Kg
Benzo(a)anthracene	495		14	27.8	ug/Kg
Benzo(a)pyrene	741		21	41.7	ug/Kg
Benzo(b)fluoranthene	1310		21	41.7	ug/Kg
Benzo(g,h,i)perylene	736		56	111	ug/Kg
Benzo(k)fluoranthene	861		21	41.7	ug/Kg

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SEA427173

King County Environmental Lab Analytical Report

PROJECT: 421168-40

Locator: KCIA_V_1757
 Descrip: KC AIRPORT STORM W
 Client Loc: KCIA-1757-060606E
 Sampled: Jun 06, 2006
 Lab ID: L39396-1
 Matrix: IN-LINESED
 % Solids: 57.6

Parameters	Value	Qual	MDL	RDL	Units
COMBINED LABS					
Benzic Acid	280	<RDL	92	464	ug/Kg
Benzyl Alcohol		<MDL	42	83.3	ug/Kg
Benzyl Butyl Phthalate	115		42	83.3	ug/Kg
Bis(2-Chloroethoxy) Methane		<MDL	120	236	ug/Kg
Bis(2-Chloroethyl) Ether		<MDL	100	208	ug/Kg
Bis(2-Chloroisopropyl) Ether		<MDL	100	208	ug/Kg
Bis(2-Ethylhexyl) Phthalate	63900		47	97.2	ug/Kg
Caffeine		<MDL	42	83.3	ug/Kg
Carbazole	132		48	97.2	ug/Kg
Chrysene	1010		28	55.6	ug/Kg
Coprostanoil	1150		97	194	ug/Kg
Dibenzo(a,h)anthracene	184		49	97.2	ug/Kg
Dibenzofuran		<MDL	97	194	ug/Kg
Diethyl Phthalate		<MDL	42	83.3	ug/Kg
Dimethyl Phthalate		<MDL	78	153	ug/Kg
Di-N-Butyl Phthalate		<MDL	35	69.4	ug/Kg
Di-N-Octyl Phthalate	110	<RDL	56	111	ug/Kg
Fluoranthene	1910		56	111	ug/Kg
Fluorene		<MDL	90	153	ug/Kg
Hexachlorobenzene		<MDL	4.7	9.24	ug/Kg
Hexachlorobutadiene		<MDL	5.2	10.4	ug/Kg
Hexachloroethane		<MDL	100	208	ug/Kg
Indeno(1,2,3-Cd)Pyrene	684		63	125	ug/Kg
Isophorone		<MDL	130	264	ug/Kg
Napthalene		<MDL	97	194	ug/Kg
Nitrobenzene		<MDL	110	222	ug/Kg
N-Nitrosodimethylamine		<MDL	140	278	ug/Kg
N-Nitrosodi-N-Propylamine		<MDL	63	125	ug/Kg
N-Nitrosodiphenylamine		<MDL	140	278	ug/Kg
Pentachlorophenol		<MDL	47	186	ug/Kg
Phenanthrene	703		28	55.6	ug/Kg
Phenol		<MDL	63	125	ug/Kg
Pyrene	1450		28	55.6	ug/Kg
Pyridine		<MDL	190	370	ug/Kg
M-OR WDOE NWTPH-DX (7-3-06-001)					
Diesel Range (>C12-C24)	1600	H,TA	43	43	mg/Kg
Lube Oil Range (>C24)					

* Not converted to dry weight basis for this parameter

fecal matter; probably fr. brocolider